

HEAVY METAL ACCUMULATION AND ANTIMICROBIAL ACTIVITY OF SOME COMMON BRYOPHYTES IN KADUGANNAWA AREA OF SRI LANKA: CASE STUDY

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Bryophytes occupy a pivotal position in the land plant phylogeny as the first plant group that evolved on land. They are used as biomonitoring agents of environmental pollution and antimicrobial agents due to their unique characters. Although Sri Lanka harbours a rich diversity of bryophytes, their application as biomonitors and antimicrobial agents have not yet been researched. The present study explored the heavy metal accumulation capacity and antimicrobial activity of some common bryophytes at Kadugannawa in the Central Province of Sri Lanka. Fresh specimens of bryophytes were periodically collected over two months along the roadside in Kadugannawa (a polluted environment) and identified up to the genus/species level. Identified samples were assessed for metal composition using X-ray fluorescence spectrometry (XRF). Specimens were assessed to check the accumulation capacity of heavy metals, including Mn, Pb, Cu, Ni, Cr, and Cd, through the acid digestion method using Atomic Absorption Spectroscopy (AAS) and Atomic Emission Spectroscopy (AES). Data were presented at a significance level of $p < 0.05$. The antimicrobial potential was tested against pathogenic microorganisms *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans* using well diffusion method. Five species, including *Dumortiera hirsuta*, *Marchantia papillata*, *Plagiochasma rupestre*, *Riccia billardieri* and *Philonotis* sp. were identified. Among the heavy metals tested, Mn and Cr were the highest in concentration in *M. papillata*. *Plagiochasma rupestre* showed the highest accumulation of Ni and Pb while *Philonotis* sp. showed the highest accumulation of Cd and Cu. *Marchantia papillata* and *D. hirsuta* showed a high degree of inhibition of *S. aureus*. All species displayed inhibition of *E. coli*. *M. papillata*, *D. hirsuta* and *R. billardieri* showed antifungal activity against *C. albicans*. The present study emphasizes the need for further research in polluted and unpolluted areas to assess the potential use of bryophytes as biomonitoring agents and their use in the production of antimicrobial agents in Sri Lanka.

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